

Amendment and Response

Applicant: Manoj K. Bhattacharyya et al.

Serial No.: 10/735,941

Filed: Dec. 15, 2003

Docket No.: 10014277-2

Title: MAGNETIC SHIELDING FOR MRAM DEVICES

REMARKS

The following remarks are made in reply to the Office Action mailed October 13, 2005, in which claims 13-20 and 22-38 are rejected. With this Response, claims 13 and 22 have been amended. Claims 13-20 and 22-38 remain pending in the application and are presented for reconsideration and allowance.

Claim Rejections under 35 U.S.C. § 102

Claims 13, 19, 23-24, 28, and 30-38 stand rejected under 35 U.S.C. §102(e) as being anticipated by Tuttle et al. (U.S. Patent No. 6,625,040, hereinafter "Tuttle '040").

The Office Action states, in part:

"Tuttle discloses a method for shielding a magnetic random access memory module from stray magnetic fields, comprising:
attaching a layer of electrically insulating material 20 (a resin) adjacent a first side of magnetic memory array 12 in the memory module, fig. 1-4, col. 4, lines 1-12, col. 2, lines 40-67,
attaching a layer of permeable metal 22 over the insulating material 20 of first side of the magnetic memory array 12, col. 3, lines 1-67,
attaching (33) a layer of permeable metal 28 over the insulating material 20 of second side of the magnetic memory array 12,
permeable metal magnetic shield is a soft magnetic material of iron and nickel alloy, para. 4, 30."

The rejection under 35 U.S.C. §102(e) is respectfully traversed. Under 35 U.S.C. §102, the cited reference must show each and every feature of the claimed invention. Extension of or speculation as to the cited teaching is permitted only when *necessarily present* in the disclosed apparatus or method. In other words, if a particular feature is not specifically disclosed it can only be relied upon under 35 U.S.C. §102 if and only if such feature is necessarily present in the disclosed apparatus or method. See, *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) ("A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference"), and *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989) ("The identical invention must be shown in as complete detail as is contained in the . . . claim").

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Independent claim 13 has been amended to clarify that the layer of electrically insulating material and the layer of permeable metal are positioned *within* the memory module. Applicants respectfully submit that Tuttle '040 fails to show each and every feature of amended independent claim 13. In particular, Applicants submit that **Tuttle '040 fails to teach *at least* “wherein the layer of electrically insulating material and the layer of permeable metal are positioned within the memory module”**, and such feature is not *necessarily present* in the disclosed apparatus.

Tuttle '040 teaches that the variously illustrated magnetic shielding layers used to protect the magnetically sensitive integrated circuits 12 are either *on or within the printed circuit board 20* (i.e., magnetic shielding layer 22, Fig. 2; magnetic shielding layer 44, Fig. 3; and magnetic shielding layer 55, Fig. 4), or otherwise *spaced away from the magnetically sensitive integrated circuits 12* (i.e., magnetic shielding packaging material 33, Figs. 2, 3 and 4). There is simply no teaching or suggestion in Tuttle '040 that the magnetic shielding layers 22, 33, 44 and 55 are or may be positioned within the magnetically sensitive integrated circuit 12. There certainly is no teaching or suggestion in Tuttle '040 that such positioning of magnetic shielding layers is *necessarily present*. For at least these reasons, Applicants respectfully submit that Tuttle '040 fails to teach or suggest each and every feature of the invention as set forth in amended independent claim 13. Accordingly, withdrawal of the rejection of claim 13 under 35 U.S.C. §102(e) is respectfully requested.

Independent claim 33 sets forth a method for shielding a magnetic memory array from stray magnetic fields. The method comprises covering a first side of the magnetic memory array with a continuous layer of permeable material. Applicants respectfully submit that Tuttle '040 fails to show each and every feature of independent claim 33. In particular, Applicants submit that **Tuttle '040 fails to teach “covering a first side of the magnetic memory array with a continuous layer of permeable material”**, and such feature is not *necessarily present* in the disclosed apparatus.

Tuttle '040 states that the magnetically sensitive integrated circuits 12 “include *internal* electromagnetic structures, such as MRAM cells and access circuitry.” (Col. 2, lines 55-58, emphasis added). Thus, for the magnetic shielding layers of Tuttle '040 to cover a first side of a magnetic memory array, as set forth in independent claim 33, the

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magnetic shielding layers would necessarily be positioned within the integrated circuits 12. However, as discussed above with respect to independent claim 13, Tuttle '040 teaches the variously illustrated magnetic shielding layers 22, 33, 44, 44 used to protect the magnetically sensitive integrated circuits 12 are either *on or within the printed circuit board 20*, or otherwise *spaced away from the magnetically sensitive integrated circuits 12*. There is simply no teaching or suggestion in Tuttle '040 that the magnetic shielding layers 22, 33, 44 and 55 are or may be positioned within the magnetically sensitive integrated circuit 12 or cover a first side of a magnetic memory array, or that such positioning of magnetic shielding layers is *necessarily present*. For at least these reasons, Applicants respectfully submit that Tuttle '040 fails to teach or suggest each and every feature of the invention as set forth in independent claim 33. Accordingly, withdrawal of the rejection of claim 33 under 35 U.S.C. §102(e) is respectfully requested.

Claims 19 and 34-38 each depend, either directly or indirectly, from one of independent claims 13 and 33 which are in allowable condition for at least the reasons set forth above. Accordingly, dependent claims 19 and 34-38 are also in allowable condition, and withdrawal of the rejection of claims 19 and 34-38 under 35 U.S.C. §102(e) is respectfully requested.

Dependent claims 23-24, 28 and 30-32, rejected under 35 U.S.C. §102(e) as being anticipated by Tuttle '040, each depend from independent claim 22 and accordingly include all of the limitations of independent claim 22. However, with respect to independent claim 22, the Office Action acknowledges that Tuttle '040 "does not teach using sputtering method and annealing in the rotating magnetic field." (Office Action, page 4, lines 3-8). Because Tuttle '040 fails to anticipate all of the limitations of independent claim 22, it also necessarily fails to anticipate all of the limitations of the claims depending from independent claim 22. For at least this reason, withdrawal of the rejection of claims 23-24, 28 and 30-32 under 35 U.S.C. §102(e) is respectfully requested.

Claim Rejections under 35 U.S.C. § 102 and § 103

Claim 22 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Tuttle '040 in view of Shimada et al. (U.S. Patent No. 4,541,213). Tuttle '040 is alleged to teach forming a magnetic shield over an MRAM module, but is acknowledged as

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failing to teach “using sputtering method and annealing in the rotating magnetic field.” Shimada et al is alleged to teach sputtering a magnetic shield 16 material and annealing under a rotating magnetic field to reduce the anisotropic magnetic field to an isotropic magnetic field.

Independent claim 22 has been amended to clarify that the layer of electrically insulating material is deposited on a surface of a magnetic memory array, and that the permeable metal layer is sputtered on the layer of electrically insulating material. As discussed above with respect to independent claim 33, Tuttle ‘040 states that the magnetically sensitive integrated circuits 12 include *internal* electromagnetic structures, such as MRAM cells and access circuitry. (Col. 2, lines 55-58, emphasis added). Thus, for a layer of insulating material to be deposited on a surface of a magnetic memory array (*within* integrated circuit 12) and for the layer of permeable metal layer to be sputtered on a surface of the electrically insulating layer, as set forth in amended independent claim 22, the magnetic shielding layers of Tuttle ‘040 would necessarily be positioned *within* the integrated circuits 12. However, as discussed above with respect to independent claims 13 and 33, Tuttle ‘040 teaches the variously illustrated magnetic shielding layers 22, 33, 44, 44 used to protect the magnetically sensitive integrated circuits 12 are either *on or within the printed circuit board 20*, or otherwise *spaced away from the magnetically sensitive integrated circuits 12*. There is no teaching or suggestion in Tuttle ‘040 that the magnetic shielding layers 22, 33, 44 and 55 are or may be positioned within the magnetically sensitive integrated circuit 12, much less be deposited on a surface of a magnetic memory array within the integrated circuit 12. Shimada et al. fails to remedy this deficiencies of Tuttle ‘040, as Shimada et al. relates to magnetic recording heads and fails to make any teaching or suggestion regarding magnetic memory arrays or the positioning of insulating layers and permeable metal layers relative to a magnetic memory array. For at least these reasons, Applicants respectfully submit that the combination of Tuttle ‘040 and Shimada et al. fails to teach or suggest each and every feature of the invention as set forth in amend independent claim 22. Accordingly, withdrawal of the rejection of claim 22 under 35 U.S.C. §103(a) is respectfully requested.

Claims 14-18, 20, 25-27, and 29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Tuttle ‘040 as applied to claims 13, 19, 23-24, 28, and 30-38 above,

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and further in view of Shimada et al. (U.S. Patent No. 4,541,213) and Durcan et al., (U.S. Publication No. 2002/0160541).

Each of claims 14-18, 20, 25-27 and 29 depend, either directly or indirectly, from one of independent claims 13 and 22, which are in allowable condition for at least the reasons discussed above. Durcan et al. fails to overcome the above-noted deficiencies of Tuttle '040 and Shimada et al., alone or in combination. Specifically, Durcan et al. fails to teach or suggest at least: wherein the layer of electrically insulating material and the layer of permeable metal are positioned within the memory module (claim 13); and depositing a layer of electrically insulating material on a surface of a magnetic memory array and sputtering a layer of permeable metal layer on the layer of electrically insulating material (claim 22). In addition, claims 14-18, 20, 25-27, and 29 are also allowable at least by reason of their dependency from an allowable independent claim. Accordingly, for at least these reasons, withdrawal of the rejections of claims 14-18, 20, 25-27 and 29 under 35 U.S.C. §103(a) is respectfully requested.

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CONCLUSION

In view of the above, Applicants respectfully submit that pending claims 13-20 and 22-38 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 13-20 and 22-38 is respectfully requested.

Any inquiry regarding this Preliminary Amendment should be directed to either Matthew B. McNutt at Telephone No. (512) 231-0531, Facsimile No. (512) 231-0540, or Philip S. Lyren at Telephone No. (281) 514-8236, Facsimile No. (281) 514-8332. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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CERTIFICATE UNDER 37 C.F.R. 1.8: The undersigned hereby certifies that this paper or papers, as described herein, are being deposited in the United States Postal Service, as Express Mail no. ET891040525US, in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 21st day of Dec., 2005.

By 
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